Journal of Aerosol Science

J. Aerosol Sci.

An International Journal

In association with the Gesellschaft für Aerosolforschung

VOLUME CONTENTS AND AUTHOR INDEX

VOLUME 20, 1989

Pergamon Press Oxford New York

Beijing Frankfurt São Paulo Sydney Tokyo Toronto

JOURNAL OF AEROSOL SCIENCE

In association with the Gesellschaft für Aerosolforschung (GAeF)
Association for Aerosol Research

Founding Editor Prof. C. N. DAVIES (from 1970 to 1984)

Aims and Scope

The *Journal of Aerosol Science* is a long-established international publication which sets out to encourage and foster all aspects of basic and applied aerosol research by publishing high quality scientific papers in that very multidisciplinary field. The submission of original papers is encouraged, describing recent theoretical and experimental research relating to:

—the basic physical and chemical properties of particles in aerosol systems of all types
—their measurement
—their formation, transport and deposition
—their industrial, medical and environmental effects and applications.

Occasional reviews of broader interest may also be considered. The aim in all published articles is to present results in a form which can be generalized as far as possible.

EDITORS-IN-CHIEF

Dr G. KASPER
American Air Liquide, Inc.,
5230 S. East Avenue,
Countryside, IL 60525, U.S.A.

Dr J. H. VINCENT
Institute of Occupational Medicine,
8 Roxburgh Place,
Edinburgh EH8 9SU, U.K.

EDITORIAL BOARD

K. R. AKSELSSON, Department of the Working Environment, Lund University Institute of Science and Technology, Box 118, S-22100, Lund, Sweden.

M. ANISIMOV, Institute of Coal of SB AS USSR, Sovetsky Prospect 18, 650099 Kemerovo, U.S.S.R.

M. R. BAILEY, National Radiological Protection Board, Chilton, Didcot, Oxfordshire OX11 0RQ, U.K.

M. M. BENARIE, Environmental Consultant, 12 rue de l'Yveline, 91229, Bretigny, France.

D. W. COOPER, IBM T. J. Watson Research Center, Room 01-203, P.O. Box 218, Yorktown Heights, NY 10598, U.S.A.

H. EMI, Faculty of Technology, Kanazawa University, 2-40-20 Kodatsuno, Kanazawa 920, Japan.

H. FISSAN, Universität Duisburg, Bismarckstrasse 81, D-4100 Duisburg, West Germany.

J. A. GARLAND, Environmental and Medical Science Division, Building 364, Harwell Laboratory, UKAEA, Oxfordshire OX11 0RA, U.K.

J. GEBHART, Gesellschaft für Strahlen- und Umweltforschung, Paul-Erhlich-Str. 20, D-6000 Frankfurt/Main, West Germany.

W. C. HINDS, Environmental and Occupational Health Sciences, School of Public Health, University of California, Los Angeles, CA 90024, U.S.A.

D. HOCHRAINER, Fraunhofer-Institut, D-5948 Schmallenberg, West Germany.

D. B. INGHAM, School of Mathematics, University of Leeds, Leeds LS2 9JT, U.K.

R. JAENICKE, Institut für Meteorologie, Johannes-Gutenberg Universität, Postfach 3980, 6500 Mainz, West Germany.

K. LESCHONSKI, Institut für Mechanische Verfahrenstechnik und Umweltverfahrenstechnik, Technische Universität Clausthal, Leibnitzstr. 15, D-3392 Clausthal-Zellerfeld, West Germany.

U. C. MISHRA, Pollution Monitoring Section, Bhabha Atomic Research Centre, Bombay 400 085, India.

J. PICH, J. Heyrovski Institute of Physical and Electrochemistry, 11000 Prague-1-Opletalova 25, Czechoslovakia.

V. PRODI, Dipartimento di Fisica, Università degli Studi di Bologna, Via Irnerio 46, I-40126, Bologna, Italy.

A. SCHMIDT-OTT, Prozess-und Aerosolmesstechnik, Universität-GH-Duisburg, Postfach 10 15 03, D-4100 Duisburg 1, West Germany.

Executive Board of GAeF

President: O. PREINING (Austria)
Vice-President: W. SCHIKARSKI (West Germany)
Members: R. C. FLAGAN (U.S.A.)
W. D. GRIFFITHS (U.K.)
C. HELSPER (West Germany)
D. HOCHRAINER (West Germany)
A. SCHMIDT-OTT (Switzerland)
W. STAHLHOFEN (West Germany)
W. STÖBER (West Germany)
Secretary-General: B. GEORGI, Nds. Inst. für Radiookologie an der Universität Hannover, Herrenhauser Str. 2, D-3000 Hannover, West Germany

The *Journal of Aerosol Science* is published by Pergamon Press

©™The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Copyright © 1990 Pergamon Press plc

CONTENTS

NUMBER 1

J. CHOMIAK and A. K. GUPTA	1	Thermophoresis in boundary layer flows
H.-R. PAUR and S. JORDAN	7	The influence of SO_2 and NH_3 concentrations on the aerosol formation in the electron beam dry scrubbing process
D. WAKE	13	Anomalous effects in filter penetration measurements using the Aerodynamic Particle Sizer (APS 3300)
G. S. SPAGNOLO	19	Automatic instrument for aerosol samples using the beta-particle attenuation
G. L. FINCH, M. D. HOOVER, J. A. MEWHINNEY and A. F. EIDSON	29	Respirable particle density measurements using isopycnic density gradient ultracentrifugation
P. C. S. DEVARA and P. E. RAJ	37	Remote sounding of aerosols in the lower atmosphere using a bistatic CW helium–neon lidar
J. R. CONDER and T. P. LIEW	45	Fine mist filtration by wet filters—II: efficiency of fibrous filters
J. R. CONDER and T. P. LIEW	59	Fine mist filtration by wet filters—III: sintered disc filters
N. P. VAUGHAN	67	The Andersen impactor: calibration, wall losses and numerical simulation
M. BERTERO, P. BOCCACCI, C. DE MOL and E. R. PIKE	91	Extraction of polydispersity information from photon correlation data
S. E. PRATSINIS and K.-S. KIM	101	Particle coagulation, diffusion and thermophoresis in laminar tube flows
R. VAN DINGENEN, F. RAES and H. VANMARCKE	113	Molecule and aerosol particle wall losses in smog chambers made of glass
M. H. PETERS, D. W. COOPER and R. J. MILLER	123	The effects of electrostatic and inertial forces on the diffusive deposition of small particles onto large disks: viscous axisymmetric stagnation point flow approximations
Discussion		
D. CAMUFFO, W. W. NAZAROFF and G. R. CASS	137	Particle deposition from a natural convection flow onto a vertical isothermal flat plate

NUMBER 2

J. GEBHART, CH. F. SCHILLER-SCOTLAND, M. J. EGAN and W. NIXON — 141 On the relationship between experimental data for total deposition and model calculations—Part I: effect of instrumental dead space

M. J. EGAN and W. NIXON — 149 On the relationship between experimental data for total deposition and model calculations—Part II: application to fine particle deposition in the respiratory tract

H.-K. CHAN and I. GONDA — 157 Aerodynamic properties of elongated particles of cromoglycic acid

M. R. BAILEY, W. G. KREYLING, S. ANDRE, A. BATCHELOR, C. G. COLLIER, E. DROSSELMEYER, G. A. FERRON, P. FOSTER, B. HAIDER, A. HODGSON, R. MASSE, H. METIVIER, A. MORGAN, H.-L. MÜLLER, G. PATRICK, I. PEARMAN, S. PICKERING, D. RAMSDEN, C. STIRLING and R. J. TALBOT — 169 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part I: objectives and summary of results

P. P. FOSTER, I. PEARMAN and D. RAMSDEN — 189 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part II: lung clearance of inhaled cobalt oxide in man

S. ANDRE, H. METIVIER and R. MASSE — 205 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part III: lung clearance of inhaled cobalt oxide particles in baboons

W. G. KREYLING, G. A. FERRON and B. HAIDER — 219 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part IV: lung clearance of inhaled cobalt oxide particles in Beagle dogs

C. G. COLLIER, M. R. BAILEY and A. HODGSON — 233 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part V: lung clearance of inhaled cobalt oxide particles in hamsters, rats and guinea-pigs

G. PATRICK, A. L. BATCHELOR and C. STIRLING — 249 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part VI: lung clearance of inhaled cobalt oxide particles in SPF Fischer rats

E. DROSSELMEYER, H.-L. MÜLLER and S. PICKERING — 257 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part VII: lung clearance of inhaled cobalt oxide particles in Sprague–Dawley rats

R. J. TALBOT and A. MORGAN 261 An interspecies comparison of the lung clearance of inhaled monodisperse cobalt oxide particles—Part VIII: lung clearance of inhaled cobalt oxide particles in mice

F. S. ROSENTHAL 267 Aerosol recovery following breathholding derived from the distribution of chordlengths in pulmonary tissue

NUMBER 3

i Obituary Notice: Alexander Georgievich Sutugin (1940–1988)

iii Obituary Notice: Jean Bricard (1907–1988)

J. C. BARRETT and H. J. FISSAN 279 Aerosol growth by condensation in a well-mixed chamber

J. F. HICKS, J. N. PRITCHARD, A. BLACK and W. J. MEGAW 289 Measurements of growth due to condensation for some common aerosols

C. F. CLEMENT and I. J. FORD 293 Maximum aerosol densities from evaporation–condensation processes

Y. MAMANE and J. GOTTLIEB 303 Heterogeneous reactions of minerals with sulfur and nitrogen oxides

D. B. O'HARA, J. S. CLEMENTS, W. C. FINNEY and R. H. DAVIS 313 Aerosol particle charging by free electrons

R. G. KNOLLENBERG 331 The measurement of latex particle sizes using scattering ratios in the Rayleigh scattering size range

R. L. BUCKLEY and S. K. LOYALKA 347 Cunningham correction factor and accommodation coefficient: interpretation of Millikan's data

M. RAM, R. I. GAYLEY and G. E. SHAW 351 Empirical functions for atmospheric aerosol size distributions

B. ASGHARIAN and C. P. YU 355 Deposition of fibers in the rat lung

B. Y. H. LIU, Z. Q. ZHANG and T. H. KUEHN 367 A numerical study of inertial errors in anisokinetic sampling

W. HOLLÄNDER, G. POHLMANN and G. MORAWIETZ 381 A laser Doppler method for the determination of particle deposition velocities

391 Conference Report

395 Book Reviews

397 Announcements

I New Patents

NUMBER 4

401 Editorial

J. R. Turner, D. K. Liguras and H. J. Fissan — 403 Clean room applications of particle deposition from stagnation flow: electrostatic effects

M. Shimada, K. Okuyama and Y. Kousaka — 419 Influence of particle inertia on aerosol deposition in a stirred turbulent flow field

K. H. Im and R. K. Ahluwalia — 431 Turbulent eddy deposition of particles on smooth and rough surfaces

F. Stratmann and E. R. Whitby — 437 Numerical solution of aerosol dynamics for simultaneous convection, diffusion and external forces

D. T. Allen and E. Palen — 441 Recent advances in aerosol analysis by infrared spectroscopy

K. Takami, T. Yachi, I. Hourai and Y. Yatsugake — 457 Performance criteria and evaluation of surface scanners

D. S. Ensor, A. S. Viner, E. W. Johnson, R. P. Donovan, P. B. Keady and K. J. Weyrauch — 471 Measurement of ultrafine aerosol particle size distributions at low concentrations by parallel arrays of a diffusion battery and a condensation nucleus counter in series

J. J. Wu, D. W. Cooper and R. J. Miller — 477 Evaluation of aerosol deconvolution algorithms for determining submicron particle size distributions with diffusion battery and condensation nucleus counter

H. Y. Wen and G. Kasper — 483 On the kinetics of particle reentrainment from surfaces

499 Book Review

501 Announcement

NUMBER 5

C.-T. Lee and D. Leith — 503 Drag force on agglomerated spheres in creeping flow

J. M. Foss, M. F. Frey, M. R. Schamberger, J. E. Peters and K. H. Leong — 515 Collection of uncharged prolate spheroidal aerosol particles by spherical collectors—I: 2D motion

G. Raimann, H. Horvath and R. Hitzenberger — 533 Monte-Carlo simulations of slip corrections of spheres and cubes

C. Roth, U. Berlauer and J. Heyder — 547 Particle size analysis of log–normally distributed ultrafine particles using a differential mobility analyser

H. W. Gäggeler, U. Baltensperger, M. Emmenegger, D. T. Jost, A. Schmidt-Ott, P. Haller and M. Hofmann — 557 The epiphaniometer, a new device for continuous aerosol monitoring

C. W. Lee and B. R. Sundheim — 565 Photoemission from a spherical particle suspended in an electric field. The Smoluchowski model

C. M. Rojas, D. Goossens and R. Van Grieken — 569 Penetration of atmospheric aerosols during collection in cellulose filters, studied by secondary ion mass spectrometry

Y. Mamane and J. Gottlieb — 575 The study of heterogeneous reactions of carbonaceous particles with sulfur and nitrogen oxides using a single particle approach

S. M. Kreidenweis, R. C. Flagan, J. H. Seinfeld and K. Okuyama — 585 Binary nucleation of methanesulfonic acid and water

I. N. Tang and K. H. Fung — 609 Characterization of inorganic salt particles by Raman spectroscopy

Technical Note
B. Eliasson — 619 Unipolar a.c. field charging

625 Book Reviews

i New Patents

NUMBER 6

P. S. Lee, R. A. Gorski, J. T. Johnson and S. C. Soderholm — 627 Generation of diesel particles coated with polycyclic aromatic compounds—evidence suggesting that dinitropyrene formation is a collection artifact

A. L. Batchelor — 639 Clearance of inhaled tourmaline rock dust from the rat lung

S. Andre, J. Charuau, G. Rateau, C. Vavasseur and H. Métivier — 647 Design of a new inhalation device for rodents and primates

T. L. Chan, D. M. White and S. A. Damian 657 Exposure characterization of aerosols and carbon monoxide from supplemental inflatable restraint (automotive air bag) systems

E. A. Bondietti and C. Papastefanou 667 Large particle nitrate artifacts in the aerodynamic size distributions of ambient aerosols

I. Owen, A. A. El-Kady and J. W. Cleaver 671 Deposition of sub-micrometre particles onto a heated surface with widely spaced roughness elements

T. W. Peterson, F. Stratmann and H. Fissan 683 Particle deposition on wafers: a comparison between two modeling approaches

J. Pluciński, L. Gradoń and J. Nowicki 695 Collection of aerosol particles in a cyclone with an external electric field

B. J. Jurcik, Jr, J. R. Brock and I. Trachtenberg 701 A study of low pressure particle impaction processes

Z. Q. Zhang and B. Y. H. Liu 713 On the empirical fitting equations for aspiration coefficients for thin-walled sampling probes

Technical Note
G. N. Lipatov 721 Experimental coarse aerosol research: the 'thread-of-droplets' technique

723 Workshop Reports

733 Book Review

i Announcement

NUMBER 7

i Obituary Notice: Dr Siegfried Jordan (1930–1989)

P. Görner and J. Pich 735 Generalized theory of dispersion forces

J. Kukkonen, T. Vesala and M. Kulmala 749 The interdependence of evaporation and settling for airborne freely falling droplets

I. Colbeck, E. J. Hardman and R. M. Harrison 765 Optical and dynamical properties of fractal clusters of carbonaceous smoke

B. V. Ramarao and C. Tien 775 Aerosol deposition in two-dimensional laminar stagnation flow

Y. Otani, H. Emi, C. Kanaoka and K. Kato 787 Determination of deposition velocity onto a wafer for particles in the size range between 0.03 and 0.8 μm

E. YEE 797 On the interpretation of diffusion battery data

E. I. KAUPPINEN and R. E. HILLAMO 813 Modification of the University of Washington Mark 5 in-stack impactor

E. I. KAUPPINEN, A. V. K. JÄPPINEN, R. E. HILLAMO, A. H. RANTIO-LEHTIMÄKI and A. S. KOIVIKKO 829 A static particle size selective bioaerosol sampler for the ambient atmosphere

Technical Note
D. HALL and J. REED 839 The time dependence of the resuspension of particles

843 Book Review

845 Announcements

NUMBER 8

Special Issue: Proceedings of the 1989 European Aerosol Conference

Editors' Preface 849

Smoluchowski Award: 1989 *Recipient Prof. Dr Ing. Leon Gradoń* 851

Smoluchowski Award (GAeF) 853

Announcement 855

1. *Basic Aerosol Science*

F. LESAFFRE: Characterization of aerosol aggregates through fractal parameters. Effects due to humidity 857

H.-J. KLINGEN and P. ROTH: Size analysis and fractal dimension of diesel particles based on REM measurements with an automatic imaging system 861

A. A. LUSHNIKOV, V. V. MAKSIMENKO and A. V. PAKHOMOV: Fractal aggregates from laser plasma 865

T. CLEARY, J.-R. PAO, G. MULHOLLAND and J. W. GENTRY: Measurement and simulation of soot agglomerates and aggregates 871

I. COLBECK, K. ELEFTHERIADIS and S. SIMONS: The dynamics and structure of smoke aerosols 875

F. BAUMGÄRTNER and C. SCHAUER: On the formation mechanism of hollow-sphere aerosols 879

F. BAUMGÄRTNER, A. ZANIER and K. KREBS: On the mechanical stability of hollow NaCl-particles 883

S. K. Friedlander, W. Koch and H. H. Main: Scavenging of a coagulating fine aerosol by a coarse particle mode 887

W. Koch and S. K. Friedlander: The effect of particle coalescence on the surface area of a coagulating aerosol 891

Y. C. Chang, R.-J. Han, K. Chang, S. Soulen, M. B. Ranade, R. V. Calabrese and J. W. Gentry: Simulation and analysis of cluster breakage with applications in turbulent mixing 895

F. Stratmann and H. Fissan: Experimental and theoretical study of submicron particle transport in cooled laminar tube flow due to combined convection, diffusion, and thermophoresis 899

H. Rohatschek: Photophoretic levitation of carbonaceous aerosols 903

D. Hall: The time dependence of particle resuspension 907

A. Fromentin: Time dependent particle resuspension from a multi-layer deposit by turbulent flow 911

H.-C. Wang, H.-Y. Wen and G. Kasper: Mechanisms on particle generation by mechanical shocks 915

H.-C. Wang: Theoretical comparison on mechanisms to overcome particle surface adhesion 919

H. Y. Wen, G. Kasper and R. Udischas: Short and long term particle release from surfaces under the influence of gas flow 923

E. Gavze: The accelerated motion of particles in a fluid at low Reynolds number 927

G. N. Lipatov and E. A. Chernova: Thermophoresis of highly dispersed aerosols 931

G. N. Lipatov, S. A. Grinshpun and T. I. Semenyuk: Properties of crosswise migration of particles in ducts and inner aerosol deposition 935

G. N. Lipatov, T. I. Semenyuk, S. A. Grinshpun, V. I. Yakimchuk and A. S. Skaptsov: Interaction between coarse aerosol particles and inner walls of the upright tracts (adhesion, rebound and blow-off) 939

P. Drtina, Th. Kraut and A. Frohn: Experimental and theoretical investigation on originally monodisperse droplets injected into a turbulent channel flow 943

E. Pfalzmann and P. E. Wagner: Experimental investigations of aerosol flow stability at low Reynolds numbers 947

M. Shapiro and H. Brenner: Dispersion and deposition of aerosol particles in porous filters 951

J. Cai and F. Peterson: Efficiency for monodisperse particles in instationary filtration 955

J. Cai: Some remarks on efficiency due to dendrite formation 959

V. PRODI, S. AGOSTINI and F. BELOSI: Submicron oil droplet filtration 963

S. A. SOULEN, T. W. CLEARY, R.-J. HAN, Y.-C. CHANG and J. W. GENTRY: Size dependent penetrations from microscopy: experiment and theory 967

L. GRADOŃ, A. PODGÓRSKI and P. GRZYBOWSKI: Deposition of flexible and stiff fibrous particles 971

S. A. GRINSHPUN, G. N. LIPATOV and T. I. SEMENYUK: Aerosol separation within entrance regions of the upright channels (experiments and calculation) 975

G. N. LIPATOV and A. S. SKAPTSOV: Experimental study of the filtering unit for ultrafine aerosols 979

S. M. WALL, W. JOHN and S. L. GOREN: A modified elastic–plastic impact adhesion theory applied to particle kinetic energy loss measurements 983

A. A. LUSHNIKOV and V. A. ZAGAYNOV: Random factors in aerosol kinetics 987

N. ROTH, K. ANDERS and A. FROHN: Mutual interaction between burning aerosol droplets in the micrometer range 991

R. KARCH, G. P. REISCHL, W. WINKLMAYR, S. PAULSON, S. C. WANG, F. YIN, R. C. FLAGAN and J. H. SEINFELD: Smog chamber studies of aerosol formation in atmospheric mixtures 995

F. STRATMANN and E. WHITBY: Heterogeneous condensation in cooled laminar tube flow: a comparison of two aerosol modeling techniques 999

I. GALLILY, M. PEKAREVITCH and E. GAVZE: The coagulation and dispersion of non-spherical aerosol particles in a turbulent atmosphere 1003

H. STRAUBEL and E. STRAUBEL: Monolayers and their evaporation in molecular regions 1007

J. TIMMLER and P. ROTH: High temperature evaporation rates of solid particles 1011

C. F. CLEMENT and I. J. FORD: The homogeneous nucleation of aerosols 1015

V. M. MERKULOVICH and A. S. STEPANOV: On statistical fluctuation in coagulating aerosol 1019

M. KULMALA, A. MAJEROWICZ and P. E. WAGNER: Condensational growth at large vapour concentration: limits of applicability of the Mason equation 1023

G. BRENN and A. FROHN: Collision and coalescence of droplets of various liquids 1027

S. TOHNO and K. TAKAHASHI: Morphological changes of Pb fumes by Brownian coagulation 1031

J. J. F. STRECKER and P. ROTH: Computer simulation of shock-wave induced coagulation 1035

Yu. Ya. Efimov and B. Z. Gorbunov: Hydrogen bonding and processes of heterogeneous ice nucleation on small particles: molecular model and computer simulations 1039

V. V. Beloded, G. A. Kirichewskij and V. M. Nuzhnyj: Nucleation rate in supersaturated water vapor 1043

V. V. Beloded, G. A. Kirichewskij and V. M. Nuzhnyj: Condensation coefficient of metastable water 1047

B. Z. Gorbunov: Phenomenological theory of heterogeneous nucleation on aerosol particles in inhomogeneous medium 1051

V. V. Rjazanov: Influence of the external field on the semicoagulation time and on the aerosol life time 1055

H. Bunz and W. Schöck: Co-agglomeration of multi-component aerosols 1059

M. P. Anisimov and A. V. Taylakov: Interphase energy of critical embryo 1063

F. Nolting, C. Zetzsch, G. W. Israël and R. Böhm: The photochemical conversion of SO_2 to sulfuric acid and particulate sulfur in the presence of biogenic hydrocarbon traces 1067

W. Schneider, K. Anders and A. Frohn: Simulation of the influence of various additives to a multicomponent droplet on its stability 1071

J. Mroczka: Integral transform technique in particle sizing 1075

F. Borghese, P. Denti, R. Saija and O. I. Sindoni: Reliability of the theoretical description of electromagnetic scattering from nonspherical particles 1079

A. Pluchino: Nonlinear optical properties of CdS microspheres 1083

J.-S. Chang: The role of H_2O and NH_3 on the formation of NH_4NO_3 aerosol particles and De-NO_x under the corona discharge treatment of combustion flue gases 1087

R. M. Vanck and N. G. Bernigau: The influence of the statistical nature of the charging parameters on the particle charge 1091

J.-R. Pao, C. C. Wang, T. G. Cleary and J. W. Gentry: Equilibrium charge distribution for non-spherical particles 1095

J.-S. Chang, S. Ono and S. Teii: Numerical and experimental simulations of diffusion charging of non-spherical aerosol particles by dense bipolar ions 1099

2. *Atmospheric Aerosols*

K. R. Spurny: Physico-chemical characterization of aerosols in a forest environment (review) 1103

A. Girgzdys, A. Juozaitis and V. Ulevicius: Atmospheric aerosol formation research 1107

B. Z. Gorbunov, N. A. Kakutkina and A. E. Paschenko: Generation, measuring technique and dynamics of aerosols of metal halogenides and oxides under atmospheric conditions 1111

A. A. Ahmed: Particle size distribution of atmospheric aerosols 1115

P. Pasanen, J. Ruuskanen, E. Kaukanen and A. Pyykkönen: Fractional measurements of urban aerosols 1119

H. Graßl, L. Levkov, D. P. Eppel and H. Weber: Dynamics of trace elements carried by atmospheric aerosols in precipitating mesoscale systems 1123

A. Cress and C.-D. Schönwiese: Statistical investigations of volcanism–temperature relationships based on a new volcanic activity parameter 1127

A. Gabriel and K. H. Käselau: Fine structure in stratospheric aerosols 1131

V. I. Smirnov: On the non-equilibrium sizes and the size spectra of aerosol particles within updrafts below condensation level 1135

R. Forkel and W. Seidl: A one-dimensional numerical model to simulate liquid phase chemical reactions within radiation fog 1139

I. P. Mazin: On cloud–aerosol interactions in the atmosphere 1143

W. Seidl and R. Dlugi: Influence of aerosol type and NH_3-concentration on sulfate production in droplets near cloud base 1147

I. Solly, G. Reischl and A. Berner: Mass size distributions of humidified atmospheric aerosols and of their untreated precursors 1151

Y. Vawda, I. Colbeck, R. M. Harrison and K. W. Nicholson: The effects of particle size on deposition rates 1155

T. Schumann: Large discrepancies between theoretical and field-determined scavenging coefficients 1159

A. Waldvogel, J. Bader, H. Böhm, J. Collett, W. Giger, R. Heimgartner, D. Högl, R. Lüthi, B. Oberholzer, T. Schumann, H. H. Schiesser, W. Schmid, J. Stähelin, M. Steiner and J. Tremp: A multidisciplinary field experiment to study scavenging processes 1163

W. Behnke and C. Zetzsch: Heterogeneous formation of chlorine atoms from various aerosols in the presence of O_3 and HCl 1167

T. G. Gzirishvili, D. D. Kirkitadze, M. A. Odisharia and L. T. Trofimenko: Some results of the interaction of aerosols and ozone in various conditions 1171

G. Temnitschka, W. Winklmayr and G. P. Reischl: Analysis of fine particle dynamics using a relational database system 1173

E. Amooie-Foumeny, N. Dombrowski, S. Dunnett, D. Ingham and Y. Qi: A study of the collection characteristics of deposition gauges 1177

J. Tschiersch, B. Hietel and P. Schramel: Wet deposition of aerosol: test of the method 1181

J. Piskozub: Numerical solution of the multifrequency lidar inverse problem for the ensembles of two-concentric-sphere aerosol particles 1185

J. Ruuskanen and R. Silvennoinen: Light extinction caused by sodium sulphate and carbon-like fly ash airborne particles 1189

A. Sztyler: Elemental carbon concentration in air and its influence on attenuation of incoming solar radiation and snow cover albedo in Katowice, southern Poland 1193

A. Trier and H. Horvath: Atmospheric extinction in Santiago, Chile 1197

G. Hänel: Particles and water vapor as absorbers of solar radiation 1201

R. Hitzenberger: Absorption and mass absorption coefficients measured with the integrating plate method 1205

R. Gieray, W. Greiner and P. Wieser: Laser microprobe mass analysis of fog droplet residues 1209

C. Flesia, H. J. Koelsch, P. Rairoux, J. P. Wolf and L. Wöste: Remote measurement of the aerosols size distribution by LIDAR 1213

M. Schulz, M. Schwikowski, M. Steiger and W. Dannecker: Land–sea-transformations of polluted air masses investigated with optical particle counters and short time resolved aerosol sampling 1217

T. Schumann and R. Heimgartner: Fog and cloud droplet size spectra measured with a low-cost optical particle counter 1221

H. W. Gäggeler, U. Baltensperger, D. T. Jost, M. Emmenegger and W. Nägeli: Applications of the epiphaniometer to environmental aerosol studies 1225

M. Steiger, M. Schulz, M. Schwikowski, K. Naumann and W. Dannecker: Variability of aerosol size distributions above the North Sea and its implication to dry deposition estimates 1229

P. Keronen, R. Hillamo, Y. Viisanen and M. Kulmala: Formation of acid aerosols in Finland: field experiments 1233

M. V. Vychuzhanina, N. P. Grishina, I. P. Parshutkina, N. O. Plaude and Ye. I. Potapov: Measurements of the atmospheric aerosol in industrial and rural areas of the USSR European territory 1237

S. Fuzzi, G. Cesari, M. C. Facchini, R. Lenaz, A. Berner, D. Ferri and M. Mariotti: Characterization of atmospheric particulate matter over the eastern Mediterranean Sea 1241

U. Fritsche, A. Brockhaus, D. Hochrainer, H. E. Wichmann and J. M. Waldman: Comparison of acidic aerosols at two sites in Germany 1245

H. Jäger: The variability of the stratospheric aerosol layer over Central Europe 1249

G. M. Marcazzan, M. Maugeri and P. Bonelli: Study of a pollution transport event at an alpine mountain station 1253

C. M. Rojas, P. M. Otten and R. E. Van Grieken: Characterization of airborne particulate matter collected over the North Sea 1257

M. Bizjak, V. Hudnik, I. Grgić and D. Hrček: Chemical composition of fog and solid atmospheric particles collected during fog episodes in Ljubljana 1261

J. S. Pastuszka, J. Kolarczyk and A. Sztyler: Preliminary studies of elemental carbon mass size distribution in Katowice 1265

Yu. S. Lyubovtseva and L. G. Yatskovich: Soot in the aerosols of different regions 1269

H. Horvath, A. Trier and L. Catalan: The relationship between outdoor and indoor soot concentrations in an urban environment 1273

Th. Tuch, P. Brand, G. A. Ferron, E. Karg, W. G. Kreyling, L. Leuschel, K. Maier and J. Heyder: Properties of a sodiumbisulfite aerosol 1277

3. *Health-related Aerosols*

B. Rudell, O. Marqvardsen, K. Lindström and B. Kolmodin-Hedman: A method for controlled exposure to diesel exhaust from a continuously idling diesel engine 1281

J. Marijnissen, H. Buwalda, M. van Pinxteren, S. Lemkowitz and H. Bibo: Production of well-defined organic fibres for inhalation experiments 1285

C. Roth, S. Westenberger and W. G. Kreyling: Production of ^{111}In-labelled monodisperse aerosol particles 1289

G. Scheuch, J. Gebhart, G. Heigwer and W. Stahlhofen: A new device for human inhalation studies with small aerosol boluses 1293

G. A. Ferron, F. Erbe, G. Fürst, B. Haider, J. Haller, B. Köhl, W. G. Kreyling, G. Schumann, M. Stocker and J. Heyder: A scintillation counter for measuring removal of radioactive particles from dog lungs 1297

M. J. Egan, W. Nixon, N. I. Robinson, A. C. James and R. F. Phalen: Inhaled aerosol transport and deposition calculations for the ICRP Task Group 1301

Ch. F. Schiller-Scotland, J. Gebhart, H. Lintl, R. Siekmeier and H. Kronenberger: Human airway diameters derived from aerosol inhalation studies: reactions of non-smokers and smokers to bronchodilators 1305

R. M. Evans, D. Attwood, S. M. Chatham and S. J. Farr: A novel strategy for the formulation of medicinal aerosols 1309

W. Hofmann and L. Koblinger: The effect of polydispersity of radioactive aerosols on the activity distribution in the human lung 1313

W. G. Kreyling, S. André, C. G. Collier, G. A. Ferron, H. Métivier and G. Schumann: Interspecies comparison of lung clearance after inhalation of monodisperse, solid cobalt oxide aerosol particles 1317

W. Luo: A model for the nose and its efficiency in collecting airborne particles 1321

M. Dahlbäck, S. Eirefelt, I.-B. Karlberg and O. Nerbrink: Total deposition of Evans blue in aerosol exposed rats and guinea pigs 1325

Y. Y. Hammad and B. Attieh: Pulmonary deposition of MMMF 1329

S. Takenaka, U. Glaser, H. Oldiges and U. Mohr: Pulmonary changes in rats after long-term exposure to CdO-aerosols 1333

R. A. Roos and M. Goldman: On the behaviour of activated particles in cigarette smoke 1337

J. N. Pritchard: Dust overloading—a case for lowering the TLV of nuisance dusts? 1341

W. Möller and W. Stahlhofen: Magnetic material in the lungs of dental technicians 1345

M. Neuberger: Cancer in men from fibrous and non-fibrous mineral particles 1349

W. Wilczek, E. Drosselmeyer, I. Lind, E. Mainka and A. Seidel: Investigations on the mechanisms of the *in vitro* toxicity of the high T_c superconducting material $YBa_2Cu_3O_7$ on bovine alveolar macrophages 1353

4. *Industrial Aerosols*

R. A. Bowling and G. B. Larrabee: Clean technology for microelectronics manufacture in the U.S. 1989 and 1995 1357

P. Biswas, Y. Tian and S. E. Pratsinis: Receptor modeling of microcontamination in clean rooms 1361

J. I. T. Stenhouse and L. Arnold: Aerosol contamination of clean gases in valves 1365

M. H. Heiskanen and E. I. Kauppinen: The particle size characterization of combustion aerosols 1369

G. E. Andrews, M. K. Abbass, P. T. Williams and K. D. Bartle: Factors influencing the composition of the organic fraction of diesel particulates 1373

K. Engeljehringer and W. Schindler: The organic insoluble diesel exhaust particulates—differences between diluted and undiluted measurements 1377

C. KRUISZ, G. P. REISCHL, U. PFEIFER and F. LEHNER: The influence of a corona discharge on mass size distribution and net charge of diesel exhaust particles 1381

C. BECKMANN, G. ISRAËL and K. MOLLENHAUER: Artifact formation of nitrated polycyclic aromatic hydrocarbons during diesel soot sampling on Teflon coated glass fiber filters 1385

C. H. LIN, B. T. CHAO and S. L. SOO: Corona charging of diesel smoke 1389

A. KRASENBRINK and B. GEORGI: Continuous measurement of soot concentration in diesel exhaust 1393

S. PICKERING: The resuspension of radioactive dusts in fires 1397

S. A. RAMSDALE: The chemical conversion and dispersion of toxic sodium fire aerosols in the atmosphere 1401

W. SCHÖCK and M. WAGNER-AMBS: Aerosol generation by bubble bursting from a boiling pool 1405

G. TARRONI, C. M. CASTELLANI and T. DE ZAIACOMO: Morphological analysis and evaluation of dynamic shape factor of particles produced in a real scale sodium fire 1409

G. TYMEN, B. EL MOUSSAOUI and A. RENOUX: Dynamics of Rn-222 daughter size distribution evolution: modelling and experimental aspects 1413

W. KATSCHER and B. STAUCH: Experimental investigation of aerosol formation from metallic fission products under hypothetical accident conditions in high-temperature gas-cooled reactors 1417

K. KUGELER, CH. EPPING and J. ROES: Importance of radioactive aerosols in hypothetical high temperature reactor accidents 1421

K. W. NICHOLSON, J. R. BRANSON, P. GIESS and R. J. CANNELL: The effects of vehicle activity on particle resuspension 1425

K. P. KOUTZENOGII: Ecology and optimum aerosol technology of pesticide application 1429

M. BELOW and B. GEORGI: Plant growth—influenced by particulate nitrate application 1433

A. KRASENBRINK, B. GEORGI and H. KIßLER: Cleaning of aerosol loaded gases by a new steam generator 1437

M. MONABBATI, S. AYATOLLAHI and M. TAHERI: Test of mathematical modeling for the design of high energy scrubbers 1441

S. WITTIG, H.-J. FELD and A. TREMMEL: The application of the dispersion quotient technique for particle size and density measurements behind an Electron Beam Scrubber 1445

J. HAUTANEN: The effect of desulfurization on the function of an industrial electrostatic precipitator 1449

M. DJUPSTRÖM, E. SELIN and M. ÖBLAD: Fingerprints in the particulate emissions from an oil refinery 1453

S. E. PRATSINIS, J. D. LANDGREBE and S. V. R. MASTRANGELO: Design correlations for gas phase manufacture of ceramic powders 1457

S. E. PRATSINIS: Particle production by gas-to-particle conversion in turbulent flows 1461

A. ZAJC, E. UHLIG, H. HACKFORT and R. NIESSNER: On line and *in situ* control of aerosol emission from hazardous waste combustion 1465

D. GUZIJAN, S. BOROJEVIĆ and R. NINKOVIĆ: The complex testings of the coal drying system in the Fleissner type of drying plant 1469

H. BUSCH, W. HOLLÄNDER, K. LEVSEN, J. SCHILHABEL, F. J. TRASSER and L. NEDER: Aerosol formation during laser cutting of fibre reinforced plastics 1473

A. KLEITZ and J. J. COURANT: Probes for industrial particle measurement: application for water droplet sizing in wet steam turbines 1477

5. *Aerosol Instrumentation*

E. KARG, P. BRAND, B. HIETEL, W. G. KREYLING, K. RUOß, J. TSCHIERSCH, T. TUCH and J. HEYDER: Intercomparison of particle size spectrometers 1481

S. C. WANG and R. C. FLAGAN: Scanning electrical mobility spectrometer 1485

B. T. CHEN, Y. S. CHENG and H. C. YEH: An experimental approach to studying particle density effects in the TSI aerodynamic particle sizer (3300) 1489

A. HOSPITAL and P. ROTH: A molecular beam mobility analyser applied to nm-sized charged soot particles 1493

N. G. BERNIGAU and R. M. VANCK: Time varying charge levels as an alternative approach for aerosol concentration measurements 1497

P. BARTHOLME and K. H. KÄSELAU: A portable Aitken nuclei counter 1501

D. BOULAUD, C. COMPER and M. DIOURI: Comparison between the SDI and electrical methods for the measurement of fine aerosols 1505

R. A. ROOS and D. DUTERTRE-LADUREE: The optical and electrical measurement of aerosols produced by normalized fires 1509

G. N. LIPATOV and G. L. SHINGARYOV: Thermodiffusion chamber with longitudinal temperature gradient 1513

K. Y. K. CHUNG and J. THOMPSON: Coulter vs APS—a comparative study 1517

F. SCHRÖDER, W. KOCH and K. H. KÄSELAU: Redesign of an approved condensation nuclei counter for stationary use 1521

U. K. BOCHERT and W. DANNECKER: On-line aerosol analysis by atomic emission spectroscopy 1525

J. GEBHART, P. BRAND and C. ROTH: A combined DMA–CNC-test-system for commercial laser particle counters 1529

H. GERBER: Measurement of suspended particulate volume and far-infrared extinction coefficient with a new laser-diffraction instrument 1533

H. KOHL, J. GEBHART and E. GRÜN: Laser particle characterization under interplanetary space conditions 1537

B. SACHWEH, H. BÜTTNER and F. EBERT: Improvement of the resolution and the counting accuracy of an Optical Particle Counter by fast digital signal recording 1541

D. SEEHARS, F.-J. MÖNIG, D. HOCHRAINER, M. SPIEKERMANN and N. SCHWARZER: Measurement of the concentration and dispersion of aerosols by optical sensors in closed rooms 1545

B. G. VAN ELZAKKER and A. VAN DER MEULEN: Performance characteristics of various beta-dust monitors: intercomparison 1549

A. KRASENBRINK: Dust measurement with a new radiometric dust monitor (FH62 I-N) 1553

S. J. DUNNETT: A mathematical study of thin-walled sampling probes orientated to the flow 1557

S. A. GRINSHPUN, G. N. LIPATOV and T. I. SEMENYUK: A study of sampling of aerosol particles from calm air into thin-walled cylindrical probes 1561

V. PRODI, C. SALA, F. BELOSI, S. AGOSTINI, G. BETTAZZI and A. BILIOTTI: PERSPEC, personal size separating sampler: operational experience and comparison with other field devices 1565

W. W. SZYMANSKI and B. Y. H. LIU: An airborne particle sampler for the Space Shuttle 1569

V. PRODI, G. BETTAZZI and F. BELOSI: High temperature particle sampling with size separation 1573

W. HOLLÄNDER: Proposed performance criteria for samplers of total suspended particulate matter 1577

S. A. GRINSHPUN, T. I. SEMENYUK and G. N. LIPATOV: Working conditions for atmospheric measurements by an aerosol annular slot sampler 1581

K. D. HORTON and J. P. MITCHELL: Water droplet fragmentation in an Andersen Mark-III in-stack cascade impactor 1585

J. F. FABRIES, P. GÖRNER and R. WROBEL: A new air sampling instrument for the assessment of the thoracic fraction of an aerosol 1589

R. A. FLETCHER, E. B. STEEL, M. BEARD, C. C. WANG and J. W. GENTRY: Uniformity of particle deposition for indoor air sampling under anisokinetic conditions 1593

S. E. PRATSINIS, M. XU, P. BISWAS and K. WILLEKE: Theory for aerosol sampling through annular diffusion denuders 1597

I. A. MARSHALL, J. P. MITCHELL and W. D. GRIFFITHS: A method for presenting aerosol particles to a TSI aerodynamic particle sizer after size selection under Stokesian conditions 1601

P. M. MELTON, P. K. P. BURNELL and R. M. HARRISON: The Spinning Top Aerosol Generator (STAG) MKII—a critical appraisal 1605

B. KNEIßEL: Remote sensing of interplanetary dust: methods developed for the investigation of interplanetary dust. Fruitful tools for the analysis of aerosol clouds? 1609

G. POHLMANN and W. HOLLÄNDER: A modified laser doppler technique for simultaneous determination of particle size and deposition velocity 1613

C. XHOFFER, W. JACOB and R. VAN GRIEKEN: Application of electron energy loss spectroscopy to aerosols 1617

G. SCHWEIGER: Single microparticle analysis by Raman spectroscopy 1621

Alphabetical List of Authors I